

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Immediately following the title on the first page of the specification please insert: -  
--This application is a continuation of S.N. 08/211873, which is a 371 filing of  
PCT/EP92/02386 filed 10-19-1992.--.

Please replace all the claims in the application with the clean copy attached hereto. No changes to the claims are made by this amendment.

The following is an examiner's statement of reasons for allowance: The prior art of record fails to teach or suggest the process of the instant claims including boiling of the synthesis mixture until the silica source is dissolved and crystallizing the mixture at a temperature of 120 C or less allowing the formation of a unique product having a average largest dimension of 100nm or less and a variance in the longest dimension of 15% or less. With respect to the closest prior art of record: The evidence of record supports a finding that the crystals of 4642226 are significantly larger than 100nm. The evidence of record supports a finding the operation of the reflux in 4642226 at 98-100 C is not a temperature high enough to boil the synthesis mixture. The process of 3702886 requires crystallization take place at 125 C or higher and only produces crystals "as small as" one micron. 5672331, having a the same inventor, does not comprise prior art

and the claims thereof do not include boiling of the synthesis mixture, a particle size of 100nm or less or a variance of less than 15%. 5772980 does not comprise prior art and does not recite boiling of the synthesis mixture or disclose a product having a particle size 100nm or less without having significant numbers of outliers that fail to suggest a variance of less than 15%. US 5863516, also not prior art, the claims of which recite formation of zeolite colloidal solutions having a particle size that may be less than 100nm but, do not disclose boiling of the synthesis mixture (as above the evidence of record supports a finding that treatment at 98-100 C is not at a temperature high enough to boil the synthesis mixture). The geometric standard deviation recited fails to indicate a distribution narrow enough to have a variance of 15% or less in that variance is the square of the arithmetic standard deviation and the value of the geometric standard deviation underestimates the arithmetic as the distribution broadens.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Brunsman whose telephone number is 571-272-1365. The examiner can normally be reached on M, Th, F, Sa; 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David M Brunsman/  
Primary Examiner, Art Unit 1793

DMB

CLAIMS

1. (Previously Amended) A molecular sieve comprising single crystals or agglomerates, the crystals or agglomerates having an average largest dimension of 100 nm or less which molecular sieve has a crystal or agglomerate size distribution such that the variance in the longest dimension is less than 15% of the average longest dimension, and is capable of forming a stable colloidal suspension.
2. (Original) A molecular sieve as claimed in claim 1 in which the variance in the longest dimension is less than 10% of the average longest dimension.
3. (Previously Amended) A molecular sieve as claimed in claim 1 which is an MFI, MEL or [of] beta type zeolite.
4. (CANCELLED)
5. (Previously Amended) A process according to claim 18 [4] in which the synthesis mixture further comprises a source of aluminum, gallium, boron, chromium, iron, vanadium, alkali metal, or alkaline earth metal.
6. (Previously Amended) A process according to claim 18 [4] in which the synthesis mixture comprises ingredients present in amounts sufficient to produce an MFI or MEL zeolite on crystallization of the synthesis mixture.
7. (Previously Amended) A process according to claim 18 [4] for the production of zeolite beta in which the synthesis mixture also contains a source of aluminum.

8. (Previously Amended) A process according to claim 7 in which the silica source is added to the synthesis mixture in [which] the form of a solid and the synthesis mixture is subject to vigorous stirring.
9. (Original) A process according to claim 8 in which the silica source is silicic acid.
10. (Previously Amended) A process according to claim 18 [4] in which the molar ratio of the structure directing agent to silica in the synthesis mixture is 0.2 or greater.
11. (Previously Amended) A process according to claim 18 [4] in which the organic structure directing agent is tetramethylammonium hydroxide, tetraethylammonium hydroxide, tetrapropylammonium hydroxide or tetrabutylammonium hydroxide.
12. (Previously Amended) A process according to claim 18 [4] in which the alkalinity of the initial synthesis mixture, expressed as a molar ratio of OH/SiO<sub>2</sub>, is 1 or less.
13. (Previously Amended) A stable colloidal suspension containing a colloidal suspension of a molecular sieve [related in claim 1.] comprising single crystals or agglomerates, the crystals or agglomerates having an average largest dimension of 100 nm or less which molecular sieve has a crystal or agglomerate size distribution such that the variance in the longest dimension is less than 15% of the average longest dimension.

14.(Previously Presented) A molecular sieve as claimed in claim 3 which is an MFI type zeolite.

15.(Previously Presented) A molecular sieve as claimed in claim 3 which is an MEL type zeolite.

16.(Previously Presented) A molecular sieve as claimed in claim 3 which is a beta type zeolite.

17.(Previously Presented) A molecular sieve as claimed in claim 1 having an average crystal or agglomerate size in the range of about 25 to 80 nm.

18.(Previously Amended) A process for preparing a molecular sieve comprising single crystals or agglomerates having an average largest dimension of 100 nm or less and having a crystal or agglomerate size distribution such that the variance in the longest dimension is less than 15% of the average longest dimension, and which crystals or agglomerates are capable of forming a stable colloidal suspension, comprising:

a) forming a synthesis mixture comprising a source of silica, an organic structure directing agent in the form of a hydroxide and water, said agent being present in said mixture in an amount sufficient to cause substantially complete dissolution of the silica source present in the mixture;

- b) boiling said synthesis mixture for a period of time until said source silica is substantially completely dissolved; thereby forming a clear solution; and
- c) crystallizing said synthesis mixture at an elevated temperature of 120°C or less for a period of time sufficient to form said molecular sieve.

19. (CANCELLED)

20. (Previously Amended) The process of claim 28 [19] wherein said crystallization temperature is in the range of about 50 to 90°C and said molecular sieve is a beta type zeolite.

21. (Previously Amended) The process of claim 28 [19] wherein said molecular sieve has an average crystal or agglomerate size of about 25 to 90 nm.

22. (Previously Presented) The colloidal suspension of claim 13 in which the average variance of the longest dimension is less than 10% of the average longest dimension.

23. (Previously Presented) The colloidal suspension of claim 13 in which the colloid is an MFI, MEL or beta-type zeolite.

24. (Previously Presented) The colloidal suspension of claim 23 in which the colloid is an MFI type zeolite.

25. (Previously Presented) The colloidal suspension of claim 23 in which the colloid is an MEL type zeolite.

26. (Previously Presented) The colloidal suspension of claim 23 in which the colloid is a beta type zeolite.

27. (Previously Presented) The colloidal suspension of claim 23 wherein said colloid has an average crystal or agglomerate size of about 25 to 90 nm.

28.28. (Previously Presented) A process for preparing a molecular sieve comprising single crystals or agglomerates having an average largest dimension of 100 nm or less and having a crystal or agglomerate size distribution such that the variance in the longest dimension is less than 15% of the average longest dimension, and which crystals or agglomerates are capable of forming a colloidal suspension, comprising:

- a) forming a synthesis mixture comprising a source of silica, an organic structure directing agent in the form of a hydroxide and water, said agent being present in said mixture in an amount sufficient to cause substantially complete dissolution of the silica source present in the mixture;
- b) boiling said synthesis mixture for a period of time until said silica source is substantially completely dissolved; and
- c) crystallizing said synthesis mixture at a temperature of about 90°C or less and for a period of time sufficient to form molecular sieve.